6. Adrian wants to conserve energy. She learned that as a nation we spend approximately one quarter of our electricity on lighting. In our homes, the amount of electricity used for lighting can be reduced by using fluorescent light bulbs. If Adrian's monthly electricity bill, L in dollars, is a function of the percent, p, of fluorescent bulbs in her home, give the practical interpretation of the each of following—*i.e.*, give the meaning of the expression or statement as you would explain it to a person who knows no mathematics.

(a) (4 points) In the context of this problem, $L(0) = 100$ indicates...

When Adrian has no fluorescent light bulbs in her home, her monthly electric bill is $100.

(b) (4 points) In the context of this problem, $L'(25) = -2$ indicates...

If Adrian increases the percentage of fluorescent light bulbs in her house from 25% to 26% her monthly electric bill will decrease by approximately $2.

(c) (4 points) What does $L^{-1}(75)$ stand for?

The notation $L^{-1}(75)$ stands for the percentage of fluorescent light bulbs Adrian needs to have in her house so that her monthly bill is $75.

7. (6 points) In the wee hours of October 1st, the Michigan governor and state legislators came up with a new function called "Save Our State," denoted $\text{SOS}(x)$. The function is defined for all values and differentiable everywhere. (We all hope the slope is *positive*!) Use the **limit** definition of the derivative to define $f'(2)$ in terms of the function SOS, if

$$f(t) = \text{SOS}(2t^2).$$

$$f'(2) = \lim_{h \to 0} \frac{\text{SOS}(2\,(2+h)^2) - \text{SOS}(8)}{h}$$